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Abstract

Recently, in a Data Envelopment Analysis (DEA) framework, Färe and Grosskopf (2013) argued that the input directional distance function is invariant to affine data transformations under variable returns to scale (VRS), which includes, as a particular case, the property of translation invariance. In this paper we show that, depending on the directional vector used, the translation invariance may fail. In order to identify the directional distance functions (DDFs) that are translation invariant under VRS, we establish a necessary and sufficient condition that the directional vector must fulfill. As a consequence, we identify the characteristics that the DDFs should verify to be translation invariant. We additionally show some distinguished members that satisfy the aforementioned condition. We finally give several examples of DDFs, including input and output DDFs, which are not translation invariant.

Keywords: Data Envelopment Analysis, Directional Distance Function, Translation Invariance.

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